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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/680,971	10/06/2000	Tetsuo Yamada	P107317-00016	1444

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EXAMINER	
LONG, HEATHER R	

ART UNIT	PAPER NUMBER
2615	4

DATE MAILED: 03/30/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/680,971	YAMADA, TETSUO	
	Examiner	Art Unit	
	Heather R Long	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 October 2000*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-23* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6,11-16 and 21-23* is/are rejected.

7)☐ Claim(s) *7-10 and 17-20* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *06 October 2000* is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 3.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Drawings

1. Figure 11 should be designated by a legend such as --Prior Art-- because only that which is old is illustrated. See MPEP § 608.02(g). A proposed drawing correction or corrected drawings are required in reply to the Office action to avoid abandonment of the application. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 1-6, 11-16, and 21-23 are rejected under 35 U.S.C. 102(b) as being anticipated by Lee (U.S. Patent 5,274,476).

Regarding claim **1**, Lee discloses in Figs. 5-7b a charge transfer path comprising: a semiconductor substrate (100) having a surface region of a first conductivity type; a channel region (VCCD) formed in the surface region and extending as a whole along one direction (extension direction) on a surface of the semiconductor substrate (100), the channel region (VCCD) having a second conductivity type opposite to the first conductivity type and having a stripe plan shape defined by a pair of side edges; an insulating film formed on the

semiconductor substrate (100) and covering the channel region (VCCD); and a plurality of transfer electrodes (PG1a and PG1b) formed on the insulating film and traversing the channel region (VCCD), the transfer electrodes (PG1a and PG1b) having an overlap structure that end portions of adjacent transfer electrodes (PG1a and PG1b) overlap to define a plurality of border lines of the channel region (VCCD), and defining a plurality of charge transfer sections partitioned by the border lines in the channel region, wherein each transfer channel region (VCCD) includes a region where a plurality of charge transfer sections are juxtaposed along a direction perpendicular to the extension direction (col. 7, lines 3-37).

Regarding claim **2**, Lee discloses in Fig. 5 a charge transfer path, wherein shapes of the channel region (VCCD) and the transfer electrodes (PG1a and PG1b) are selected so that at least some of the border lines have an angle of 5° or larger relative to the perpendicular direction.

Regarding claim **3**, Lee discloses in Fig. 5 a charge transfer path, wherein at least some of the border lines have a segment generally parallel to the side edges.

Regarding claim **4**, Lee discloses in Fig. 5 a charge transfer path, wherein at least some of the charge transfer sections (VCCD) have a region whose width along the perpendicular direction changes monotonously.

Regarding claim **5**, Lee discloses in Fig. 5 a charge transfer path, wherein the channel region (VCCD) extends and periodically weaves along the extension

direction, and at least some of the border lines have a line segment slanted by an angle of 5° or larger relative to the perpendicular direction in a region of the channel region (VCCD) slanted relative to the extension direction (col. 5, lines 45-52).

Regarding claim **6**, Lee discloses in Fig. 6 a charge transfer path, wherein adjacent charge transfer sections (TG3 and TG4) contact each other along a straight border line in the region of the channel region slanted relative to the extension direction.

Regarding claim **11**, Lee discloses in Figs. 5-7b a solid state image pickup device, comprising: a semiconductor substrate (100) defining a two-dimensional surface; a number of photoelectric conversion elements (PD) disposed on the surface of the semiconductor substrate (100) along a plurality of rows and columns at constant pitches, the photoelectric conversion elements (PD) in an even column being shifted by about a half of a photoelectric conversion element pitch in the even column from the photoelectric conversion elements (PD) in an odd column, the photoelectric conversion elements (PD) in an even row being shifted by about a half of a photoelectric conversion element pitch in the even row from the photoelectric conversion elements (PD) in an odd row, and each photoelectric conversion element (PD) column including only the photoelectric conversion elements (PD) in either the odd column or the even column; a plurality of transfer channel regions (VCCD) formed on a semiconductor substrate (100), each being disposed near a corresponding photoelectric

conversion element (PD) column, having a stripe plan shape defined by a pair of side edges, and extending and weaving along the column direction; and a plurality of transfer electrodes (PG1a and PG1b) traversing the transfer channel regions and extending as a whole in the row direction, the transfer electrodes (PG1a and PG1b) having an overlap structure that end portions of adjacent transfer electrodes (PG1a and PG1b) overlap to define a plurality of border lines of the transfer channel region (VCCD), and defining a plurality of charge transfer sections partitioned by the border lines in the channel regions (VCCD), wherein each transfer channel region includes a region where a plurality of charge transfer sections are juxtaposed along a direction perpendicular to the extension direction (col. 7, lines 3-37).

Regarding claim **12**, grounds for rejecting claim 2 apply for claim 12 in its entirety.

Regarding claim **13**, grounds for rejecting claim 3 apply for claim 13 in its entirety.

Regarding claim **14**, grounds for rejecting claim 4 apply for claim 14 in its entirety.

Regarding claim **15**, grounds for rejecting claim 5 apply for claim 15 in its entirety.

Regarding claim **16**, grounds for rejecting claim 6 apply for claim 16 in its entirety.

Regarding claim **21**, Lee discloses in Fig. 6 a solid state image pickup device, wherein an area ratio between any two of the charge transfer sections (TG3 and TG4) is in a range of 1:1 to 1:5.

Regarding claim **22**, Lee discloses a method of driving a solid stage image pickup device, comprising: a semiconductor substrate (100) defining a two-dimensional surface; a number of photoelectric conversion elements (PD) disposed on the surface of the semiconductor substrate (100) along a plurality of rows and columns at constant pitches, the photoelectric conversion elements (PD) in an even column being shifted by about a half of a photoelectric conversion element pitch in the even column from the photoelectric conversion elements (PD) in an odd column, the photoelectric conversion elements (PD) in an even row being shifted by about a half of a photoelectric conversion element pitch in the even row from the photoelectric conversion elements (PD) in an odd row, and each photoelectric conversion element (PD) column including only the photoelectric conversion elements (PD) in either the odd column or the even column; a plurality of transfer channel regions (VCCD) formed on the semiconductor substrate (100), each being disposed near a corresponding photoelectric conversion element (PD) column, having a stripe plan shape defined by a pair of even side edges, and extending and weaving along the column direction; and a plurality of transfer electrodes (PG1a and PG1b) traversing the transfer channel regions (VCCD) and extending as a while in the row direction, the transfer electrodes (TG1 and TG3) having an overlap structure

that end portions of adjacent transfer electrodes overlap to define a plurality of border lines of the transfer channel region (VCCD), and defining a plurality of charge transfer sections partitioned by the border lines in the channel regions (VCCD), wherein each transfer channel region (VCCD) includes a region where a plurality of charge transfer sections are juxtaposed along a direction perpendicular to the extension direction, the method comprising the steps of: (a) accumulating electric charges in the photoelectric conversion elements (PD); (b) applying a read level voltage to a first charge transfer section near the photoelectric conversion elements (PD) and applying a transfer high level voltage to a second charge transfer section adjacent to the first charge transfer section in the row direction; and (c) changing the voltage applied to the first charge transfer section to the transfer high level voltage (col. 7, line 53 – col. 8, line 37; Figs. 8a and 8b).

Regarding claim **23**, Lee discloses in Figs. 8a and 8b a method of driving a solid state image pickup device, wherein the steps (b) and (c) are repetitively executed relative to the photoelectric conversion elements in the odd and even rows (col. 7, line 53 – col. 8, line 37).

Allowable Subject Matter

4. Claims 7-10 and 17-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. The following is a statement of reasons for the indication of allowable subject matter: Prior art neither teaches nor suggests a charge transfer path (VCCD) or a solid state image pickup device, wherein:

a. ...at least some of the charge transfer sections have each a wide region and a narrow region (claims 7 and 17).

b. ... the wide region being positioned at one end of the charge transfer section (claims 8 and 18).

c. ...adjacent charge transfer sections have both wide regions in a nearby area where the adjacent charge transfer charge sections contact (claims 9 and 19).

d. ...the narrow region reduces a width along the perpendicular direction more at a position remoter from the wide region (claims 10 and 20).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

a. Aoki et al. (U.S. Patent 5,306,906) discloses a solid state imaging device, wherein the channel region extends and periodically weaves along the extension direction, and at least some of the border lines have a line segment slanted by an angle of 5° or larger relative to the perpendicular direction in a region of the channel region slanted relative to the extension direction.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Heather R Long whose telephone number is 703-305-0681. The examiner can normally be reached on Mon. - Thurs.: 7:00 am - 4:30 pm, and every other Fri.: 7:00 am - 3:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Andrew Christensen can be reached on (703) 308-9644. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

HRL
March 19, 2004

NGOC-YEN VU
PRIMARY EXAMINER